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AN ESTABLISHMENT ON THE DISASTER GIS MAPPING SYSTEM FOR NANTOU COUNTY IN TAIWAN

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ABSTRACT

Nantou County, located at the central part of Taiwan island, includes 13 townships with total area of 410644 ha. Lots of slope land became instable and was induced by the 921 Chi-Chi earthquake since 1999. Serious sediment related disasters, such as soil erosion, landslide, soil mass movement, rock fall and debris flow resulted from high rainfall intensity and steep geomorphology, has been recognized as major detrimental parameters contributed to these disasters. Sediment disasters damaging public facilities were seriously concerned by Nantou county government. Residential properties and human lives attacked by Chi-Chi earquake and sediment related disasters were also considered as an important issue of Nantou County. To identity large-scale soil mass movement and debris flow by using satellite image processing system and aerial photography interpretation should be required in this project. Applications of GIS integrated with GPS and RS technology would be also necessary for this research. However, establishing an auto-mapping system used to estimate the disaster risk occurrence of Nantou hill slope environment County would be critical. This mapping system was setup by using disaster risk analysis on the basis of GIS/RS integration and disaster database establishment. This can give a positive guideline of sediment disaster prevention on hill slope. Also, we expect this auto-mapping system can help Nantou county government renew their disaster prevention program and keep well development of Nantou area in the near future.

KEY WORDS: Sediment Disaster, GPS, RS, GIS

INTRODUCTION

Large scale landslide and soil mass movement have attracted the attention of human in the same way as other uncontrollable natural disaster, such as earthquake, volcanism, floods and debris flow, which threaten human lifes and their properties. Slope failures is usually related to human activity such as deforestation, hillslope development and surface mining operation. In general, when slope stability is disturbed, a great variety of sliding movements take place. Because of the great damage caused by landslides to forest stands, farmland, buildings, transportation facilities and other engineering structures, they also can be recognized as a serious economic problem such as the sediment disasters occurred at Nantou County in central Taiwan.

Sediment disasters occurred at Nantou hillslope have been recognized as a big issue which was serious concerned by the resident at Nantou County. The administration of Nantou containing the area of 410,644 ha. However, Most of land areas are located at hillslope with 390,372 ha in total. Highly weathered geological formation, uneven distribution of rainfall intensity, steep geomorphology and intensive human activities have been identified as the predominated factors contributing to the sediment disasters occurred at Nantou slopeland.

Applications of GIS integrated with GPS and RS technology should be necessary for this research. This project was also critical to establish a disaster risk mapping system for Nantou hillslope. All results can give a fundamental guideline of disaster prevention program. Hopefully, this guideline can help Nantou County government set up his own sediment disaster prevention system to keep urban safe and well development of rural and city in the future.

Nantou hillslope is one of the main regions for the slopeland development in central Taiwan. The effect of Chi-Chi earthquake in 1999 on the growth of Nantou area is strong related to the development of Nantou rehabilitation and reclamation. Actually, large-scale landslide and debris flow after Chi-Chi event does have a detrimental effect on the natural environment and public facilities in Nantou County. Factors governing these sediment related disasters are complicate. Various studies have shown that most landslides and debris flow in Nantou area are natural environment related. The great diversity of factors and complexity of interrelationships, as well as the practical relevance of large scale landslide and debris flow, can be recognized only by systematic field studies. Therefore, the possible approaches used to work out these hazards was to intensively perform the field investigations by using GPS (Global positioning system) and conduct the laboratory experiments based on the soil mechanical properties determination and disaster database established by GPS/GIS integration.